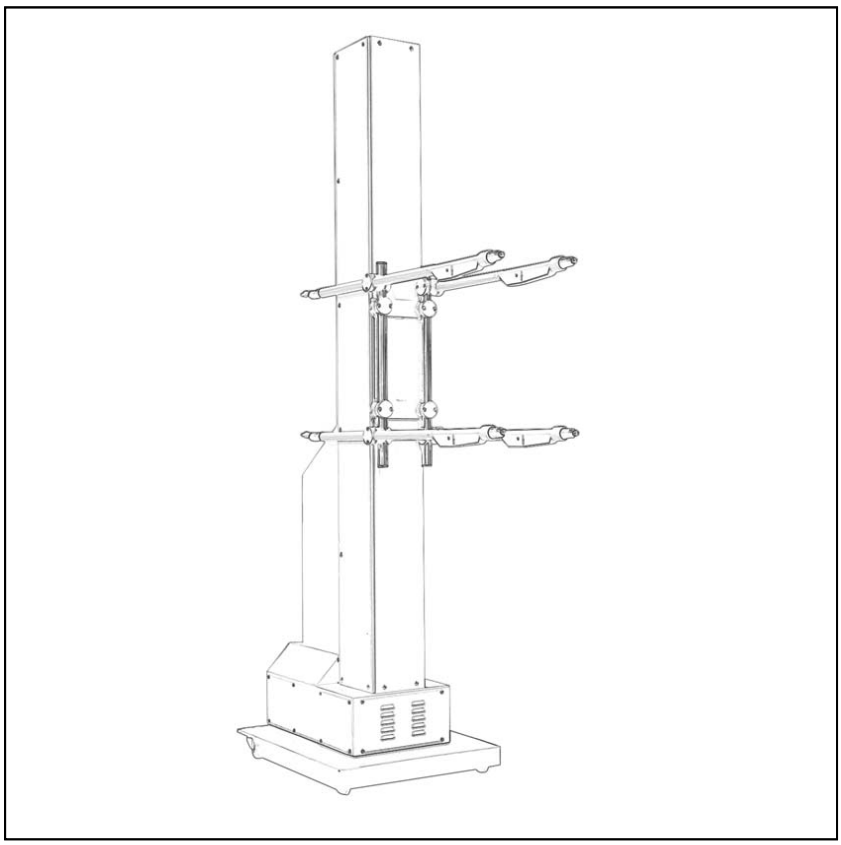
En

Operating instructions and spare parts list

ZA06 Reciprocator



Translation of the original operating instructions

Gema

Documentation ZA06

© Copyright 2006 Gema Switzerland GmbH

All rights reserved.

This publication is protected by copyright. Unauthorized copying is prohibited by law. No part of this publication may be reproduced, photocopied, translated, stored on a retrieval system or transmitted in any form or by any means for any purpose, neither as a whole nor partially, without the express written consent of Gema Switzerland GmbH.

OptiFlex, OptiTronic, OptiGun, EasyTronic, OptiSelect, OptiFlow and SuperCorona are registered trademarks of Gema Switzerland GmbH.

OptiStar, OptiSpray, OptiMatic, OptiMove, OptiMaster, OptiPlus, MultiTronic and Gematic are trademarks of Gema Switzerland GmbH.

All other product names are trademarks or registered trademarks of their respective holders.

Reference is made in this manual to different trademarks or registered trademarks. Such references do not mean that the manufacturers concerned approve of or are bound in any form by this manual. We have endeavored to retain the preferred spelling of the trademarks, and registered trademarks of the copyright holders.

To the best of our knowledge and belief, the information contained in this publication was correct and valid on the date of issue. Gema Switzerland GmbH makes no representations or warranties with respect to the contents or use of this publication, and reserves the right to revise this publication and make changes to its content without prior notice.

Printed in Switzerland

Gema Switzerland GmbH
Mövenstrasse 17
9015 St. Gallen
Switzerland

Phone: +41-71-313 83 00
Fax.: +41-71-313 83 83

E-Mail: info@gema.eu.com
Homepage: www.gemapowdercoating.com

Table of contents

General safety regulations 3

Safety symbols (pictograms) 3
Conformity of use 3
A summary of the directives and standards 4
Product-specific safety measures 5
ZA06 Reciprocator 5
Special safety regulations for ZA06 Reciprocator 5

About this manual 7

General information 7

Function description 9

ZA06 Reciprocator 9
Schematic presentation 10
Special characteristics 10
Upgrading with XT11 Horizontal axis 10

Technical data 11

ZA06 Reciprocator 11
Versions 11
Electrical data 11
Drive unit data 12
Dimensions 12

Start-up 13

Preparation for start-up 13
General information 13
Reference point 14
Electrical connections / cable connections 14
Checkpoints before switching on 15
Grounding / protection type 15
Hoses and cables 15
Reference point and mechanical stops 15
Setting the reference point 16
Setting the lower mechanical stop 17
Setting the upper mechanical stop 17

Maintenance 19

General information 19
Drive unit 19
Replacing the drive unit 20
Toothed belt 21
Tensioning the toothed belt 22
Replace the toothed belt 22
Toothed wheel 23
Replacing the upper toothed wheel 23
Z carriage - rollers 24

Decommissioning, storage 25

Introduction ... 25
Safety rules ... 25
Requirements on personnel carrying out the work ... 25
Storage conditions ... 25
Type of storage ... 25
Storage duration ... 26
Space requirements ... 26
Physical requirements ... 26
Hazard notes ... 26
Shut-down ... 26
Decommissioning ... 26
Cleaning ... 26
Preservation ... 26
Maintenance during storage ... 26
Maintenance schedule ... 26
Maintenance works ... 26

Packing, transport 27

Introduction ... 27
Requirements on personnel carrying out the work ... 27
Packing material ... 27
Selection of packing material ... 27
Procedure when packing ... 27
Transport ... 27
Data concerning goods to be transported ... 27
Loading, transferring the load, unloading ... 27

Schematic diagrams 29

ZA06 Reciprocator - wiring diagram ... 29

Frequency converter 31

Overview ... 31
General information ... 31
Function/operation ... 32
Access to menus ... 32
Access to menu parameters ... 33
Adjusted parameters ... 33
Replace the frequency converter ... 34

Spare parts list 35

Ordering spare parts ... 35
ZA06 Reciprocator - spare parts list ... 36
ZA06 Reciprocator - spare parts ... 37
ZA06 Reciprocator - toothed wheel ... 38
ZA06 Reciprocator - Z carriage (complete) ... 40
ZA06 Reciprocator - drive unit (complete) ... 42
ZA06 Reciprocator - electrical module ... 44
ZA06 Reciprocator - gun holders ... 45
Gun holder for 1-4 guns ... 45
Gun holder for 5-8 guns ... 46
Gun holder for 2x1-4 guns ... 47
Vertical gun holder ... 48
Gun fixtures and collision protection ... 49

General safety regulations

This chapter specifies out the fundamental safety regulations that must be followed by the user and third parties using the ZA06 Reciprocator.

These safety regulations must be read and understood before the ZA06 Reciprocator is used.

Safety symbols (pictograms)

The following warnings with their meanings can be found in the Gema operating instructions. The general safety precautions must also be followed as well as the regulations in the operating instructions.

DANGER!
Danger due to live electricity or moving parts. Possible consequences: Death or serious injury

WARNING!
Improper use of the equipment could damage the machine or cause it to malfunction. Possible consequences: minor injuries or damage to equipment

INFORMATION!
Useful tips and other information

Conformity of use

1. The ZA06 is built to the latest specification and conforms to the recognized technical safety regulations and is designed for the normal application of powder coating.
2. Any other use is considered non-compliant. The manufacturer shall not be liable for damage resulting from such use; the user bears sole responsibility for such actions. Gema Switzerland GmbH must be consulted prior to any use of the ZA06 Reciprocator for any purposes or substances other than those indicated in our guidelines.
3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of use. The ZA06 reciprocator should only be used, maintained and

started up by trained personnel, who are informed about and are familiar with the possible hazards involved.

4. Start-up (i.e. the execution of a particular operation) is forbidden until it has been established that the ZA06 Reciprocator has been set up and wired according to the guidelines for machinery (2006/42 EG). EN 60204-1 (machine safety) must also be observed.
5. Unauthorized modifications to the ZA06 Reciprocator exempt the manufacturer from any liability from resulting damage.
6. The relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations are to be observed.
7. Furthermore, the country-specific safety regulations also must be observed.

Explosion protection	Protection type
CE Ex II 3D	IP54

A summary of the directives and standards

European directives RL

2006/42/EG	Machinery
94/9/EWG	Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres
2004/108/EG	Electromagnetic Compatibility (EMC)

EN European standards

EN ISO 12100-1: 2004	Safety of Machinery – Basic Concepts, General Principles for Design –Part 1: Basic Terminology, Methodology
EN ISO 12100-2: 2004	Safety of Machinery – Basic Concepts, General Principles for Design – Part 2: Technical Principles
EN ISO 14121-1: 2007	Safety of Machinery – Risk Assessment, Part 1: Principles
EN 60204-1: 2006	Safety of Machinery – Electrical Equipment of Machines – Part 1: General requirements
EN 13980:2002	Potentially Explosive Atmospheres – Application of Quality Systems
EN ISO 9001: 2008	Quality Management Systems – Requirements
EN 12981+A1: 2009	Coating plants - spray booths for application of organic powder coating material/safety requirements
EN 50177:2006	Stationary electrostatic spraying equipment for flammable coating powder [2)]
EN 1953:1998	Atomising and Spraying Equipment for Coating Materials

EN 61241-0:2006	Electrical Apparatus for Use in the Presence of Combustible Dust. General requirements
EN 61241-2-2: 1995	Electrical Apparatus for Use in the Presence of Combustible Dust. Part 2: Methods
EN 61241-10: 2004	Electrical Apparatus for Use in the Presence of Combustible Dust. Part 10: Classification of Areas Where Combustible Dusts Are or May Be Present
EN 1127-1:2008	Explosive Atmospheres . Basic Concepts and Methodology

Product-specific safety measures

ZA06 Reciprocator

The ZA06 Reciprocator is a constituent part of the system and is thus integrated into the safety system of the plant.

If it is to be used in a manner outside the scope of the safety concept, then corresponding measures must be taken.

Note:
For further information, see the more detailed Gema safety regulations!

Special safety regulations for ZA06 Reciprocator

1. The ZA06 Reciprocator should only be started up after carefully reading of these operating instructions. Incorrect operation of the reciprocator control unit can lead to accidents, malfunctions or damage to the plant
2. **Attention, the power of the reciprocators/axes is very much stronger than that of a human being!**
   All axes must be secured against access during operation (see local regulations).
   Never stand under the Z carriage when the reciprocator is not operating!
3. The plugs and sockets of the reciprocator control unit and the power unit of the ZA06 Reciprocator should only be unplugged when the power supply is disconnected
4. The connecting cables between the control unit and the reciprocator must be laid in such a way, that they cannot be damaged during axes operation. Please observe the local safety regulations!
5. The maximum upper stroke limit of the reciprocator must always be set with reference to the maximum height of the booth gun slots. If an incorrect (too high) stroke limit is set, this can lead to damage to the reciprocator and/or the booth!

Warning:
During a test run, it must be guaranteed that the unit is not dam-

aged by the test! In particular, the limitations of the stroke range have to be observed (for further information, see chapter "Setting the upper mechanical stop")!

6. When repairing the reciprocator, both the reciprocator control unit and the reciprocator must be disconnected from the mains according to the local safety regulations!
7. Repairs may be done only by authorized Gema service centers! Unauthorized conversions and modifications can lead to injuries and damage to the equipment. The Gema Switzerland GmbH guarantee would no longer be valid.
8. Only original Gema spare parts should be used! The use of spare parts from other manufacturers will invalidate the Gema guarantee conditions!
9. We point out that the customer himself is responsible for the safe operation of the equipment. Gema Switzerland GmbH is in no way responsible for any resulting damage.

About this manual

General information

This operating manual contains all the important information which you require for the working with the ZA06 Reciprocator. It will safely guide you through the start-up process and give you references and tips for the optimal use of your new powder coating system.

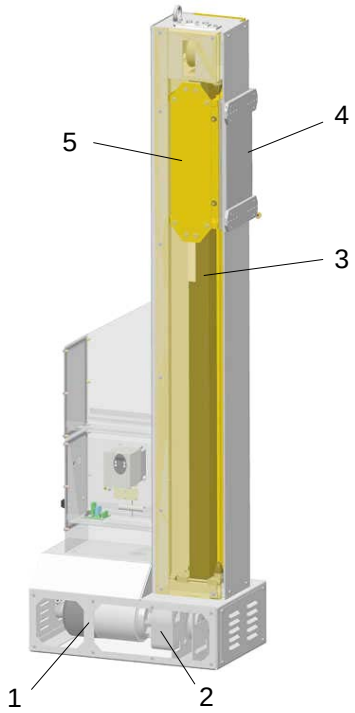
Information about the function mode of the individual system components - reciprocators, booths, powder gun control units, powder guns etc. - should be referenced to their corresponding documents.

Function description

ZA06 Reciprocator

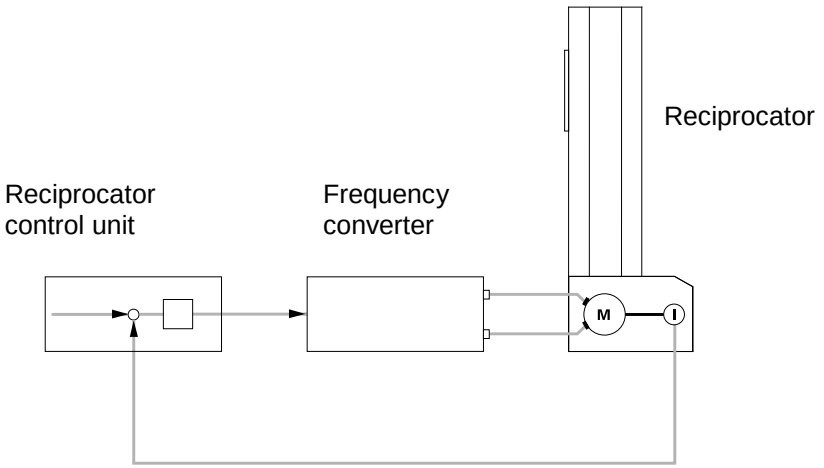
The ZA06 Reciprocator (moving axis) was designed for automatic coating with powder guns. The reciprocator carriage oscillates vertically on the column. The movement sequences (stroke and stroke speed) are controlled by the reciprocator control unit.

The gun holders are fitted on the shield (**4**) of the Z carriage (**5**). The Z carriage (**5**) is moved up and down on the central column by a toothed belt (**3**) inside the reciprocator. This vertical column serves also as a runway for the rollers. The drive unit (**2**) and the electrical connection are installed in the reciprocator base (**1**) An incremental pulse generator, which is installed in the motor case, enables the exact positioning of the Z carriage.



ZA06 Reciprocator - vertical cross-section

Schematic presentation



Schematic presentation

Special characteristics

The ZA06 Reciprocator is conspicuous because of its rugged construction, a new drive system and an improved Z axis carriage design.

Further characteristics:

- 50 kg load capacity for automatic gun and gun holders
- Built-in holding brake
- Quiet running
- High speed, maximum acceleration and braking action
- Safe operation and simple maintenance
- High efficiency due to low energy consumption
- Designed for continuous operation
- Mobile version available
- IP54 protection type
- 4 standard stroke heights available: 1.3 m/1.8 m/2.3 m/2.8 m
- Intermediate and larger sizes available in steps of 250 mm

Upgrading with XT11 Horizontal axis

The ZA06 Reciprocator can be equipped with the XT11 Horizontal axis, if required. The XT11 Horizontal axis extends the travel distance und the functionality of the reciprocator.

Technical data

ZA06 Reciprocator

Versions

The ZA06 Reciprocator is available, depending on operational area, in four versions with different standard stroke heights.

Reciprocator	ZA06-13	ZA06-18	ZA06-23	ZA06-28
Reciprocator height	2.385 m	2.885 m	3.385 m	3.885 m
Stroke length	up to 1.3 m	up to 1.8 m	up to 2.3 m	up to 2.8 m
Stroke speed	0.08 up to 0.6 m/s			
Acceleration	0.1-2.0 m/s²			
Position detection	with incremental pulse generator			
Max. lifting weight	max. 50 kg on the Z carriage			

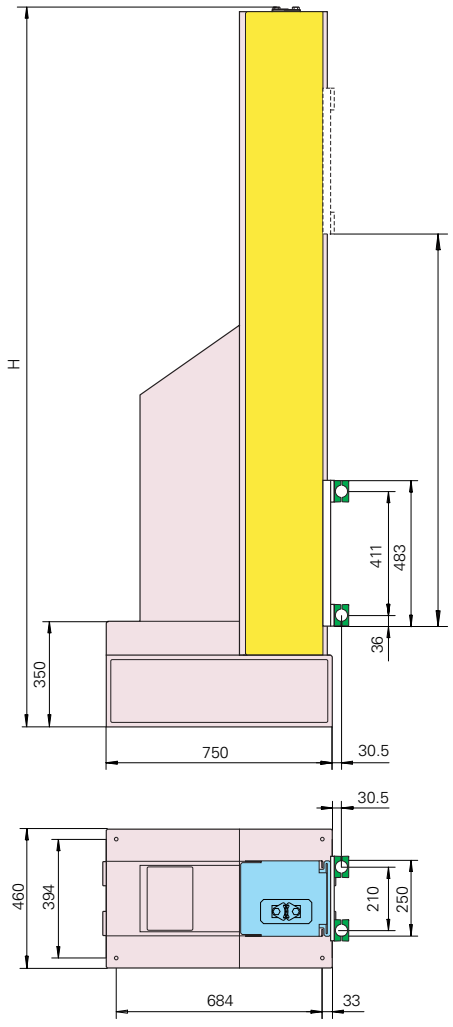
Electrical data

ZA06 Reciprocator	
Power supply	230 VAC (from control unit)
Tolerance	± 10%
Power consumption	1.1 kW
Frequency	50/60 Hz
Protection type	IP54
Isolation	Class F
Control unit	OptiMove CR04/CR05/CR06
Temperature range	0°C - 40°C (32°F - 104°F)

Drive unit data

ZA06 Reciprocator	
Drive unit	Asynchronous three-phase AC motor
Performance	0.75 kW
Motor voltage/frequency	3x230 VAC, 87 Hz
Electrical wiring	Triangle/three phase
Motor RPM	2450 1/min
Drive torque	80 Nm
Brake torque	10 Nm
Lubricant type	Shell Omala 220
Lubricant quantity	0.25 liters

Dimensions



ZA06 Reciprocator - dimensions

Start-up

Preparation for start-up

Attention:
Before connecting or switching on the reciprocator, read carefully these operating instructions!
Before the reciprocator is put into operation, the upper stroke limit must be set on the reciprocator control unit!

(see therefore the user manual of the reciprocator control unit)

General information

Attention:
Before start-up works are done, make certain that nobody can switch on the reciprocator! Switch off and lock the mains switch!

Before starting up, the following checks should be done:

- Check the gun holder and hose holder if they are firmly fitted. Mount the gun holder in such a way that they do not hit the bottom of the booth slots on start-up and cause damage
- Lay out the cables and hoses in such a way that even at the highest stroke no strain can arise
- Make sure that no guns can collide with the work pieces
- Check the grounding of the guns and hose carriers
- Check if the upper and the lower reversing point of the Z carriage are set correctly. The stroke length of the reciprocator must be in the range of the booth opening (collision danger!)
- Make sure that the automatic guns cannot collide with the work pieces (incorrectly adjusted stroke parameters on the reciprocator control unit)

Reference point

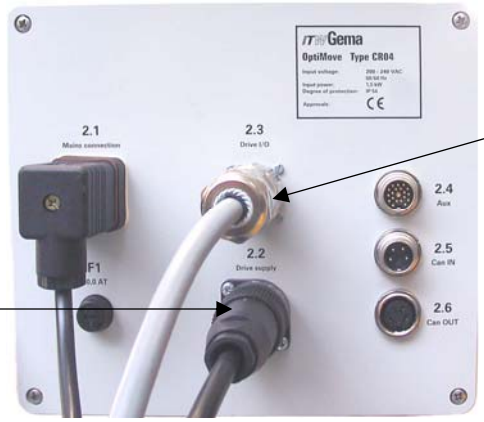
At every start-up after the mains have been interrupted, the reference point of the reciprocator must be referred again (see "Reference point and mechanical stops")! After the reference point is reached, the reciprocator begins to carry out the movements set on the reciprocator control unit.

Before the reciprocator is put into operation, the upper stroke limit must be set on the reciprocator control unit (see therefore the corresponding reciprocator control unit operating manual)!

Attention:
Incorrect setting of the upper and lower stroke limits can cause damages to the reciprocator, to the booth and/or to the applicators!

Electrical connections / cable connections

ZA06 Reciprocator - connections



OptiMove Control unit - connections

- The ZA06 power supply line is connected to the **2.2 Drive supply** connection on the reciprocator control unit by the ZA06 power supply cable
- The ZA06 Drive I/O connection is connected to the **2.3 Drive I/O** connection on the reciprocator control unit by the ZA06 signal cable

Checkpoints before switching on

Before switching on, the following checks should be done:

- Check if the cables and hoses are laid out correctly
- Check if the guns have a clear run and do not touch the booth slots
- Check the distance between the work pieces and the guns

Attention:
Before connecting or switching on the reciprocator, read carefully these operating instructions!

Grounding / protection type

All metal parts of the reciprocator must be grounded according to the local safety regulations. The gun holders must be connected to the grounding screw on the reciprocator base by the grounding strip.

All electrical installations are implemented in accordance to VDE IP54 protection type regulations!

Hoses and cables

All movable hoses and cables must be laid out in such a way that they are neither subjected to any loads nor can hang on other parts. The electric cables of the reciprocators must be protected from mechanical damage.

Reference point and mechanical stops

The reference point serves as starting point for the reciprocator control unit for calculating the upper and lower reversing point and the maximum stroke.

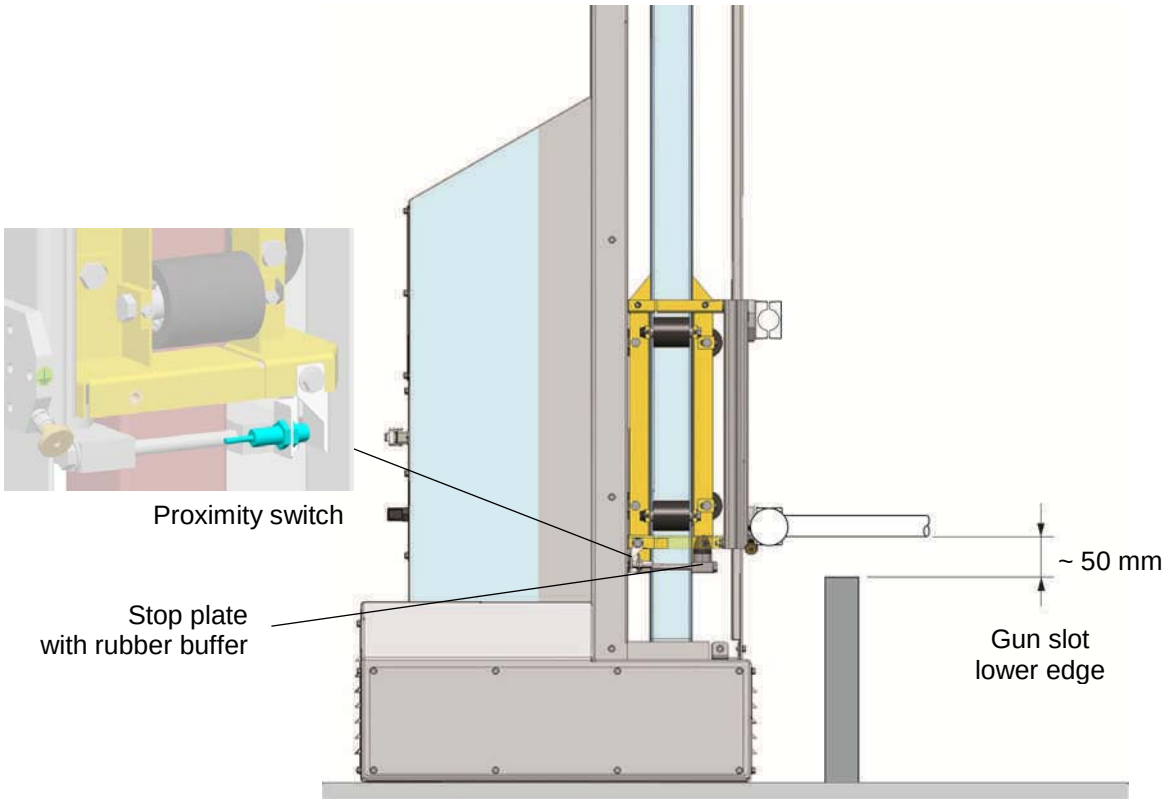
By switching on the reciprocator control unit, the reciprocator travels automatically to the reference point (proximity switch). The reciprocator control units are programmed in such a way that the reference point is always located 50 mm above the reversing point.

For transport reasons, the ZA06 Reciprocator is delivered with the rubber buffer and the carriage in lowest position.

Attention!
In order to avoid damages to the booth or the gun holder etc. the reference point must be set before the first start-up!

Setting the reference point

1. Move the stop plate with rubber buffer and proximity switch to the desired position and fasten it
2. Set the response gap of the proximity switch to approx. 2 mm
3. Consider the lower edge of the gun slot!



ZA06 reciprocator - reference point and mechanical stops

Attention:
In order to avoid damages to the booth or the gun holders, the reference point must be checked before the first start-up and if necessary, reset!
It must be noted that the axes in reference travel moves up to 25 mm below the control's zero point, therefore the mechanical stop must be set in accordance to the gun slots!

The position of the upper and the lower stop plate is set by an Gema service engineer when the reciprocator is assembled.

Attention:
The reference point must be referenced before each start-up (at each switching on, after an interruption of the power supply etc.)!

Setting the lower mechanical stop

Attention:
The setting of the lower mechanical stop must take place without load and the reciprocator must be disconnected from mains!

Procedure:

1. Release the brake switch manually
2. Let the Z carriage sink down until the powder gun holder is approximately 50 mm above edge of the gun slot
3. Remove the boarding/side panels
4. Loosen the screws and move the lower stop plate up to the Z carriage
5. Tighten the screws
6. Refit the boarding/side panels

Setting the upper mechanical stop

Attention:
The setting of the upper mechanical stop must take place without load and the reciprocator must be disconnected from mains!

In order to set the upper mechanical stop, the stop position hast to be measured - for this reason, consider the maximum height of the booth gun slots!

Attention:
An incorrect (too high) set stroke limit can lead to damage to the reciprocator and/or the booth!

Procedure:

1. Remove the boarding/side panels
2. Loosen the screws and move the upper stop plate up to the measured position
3. Tighten the screws
4. Refit the boarding/side panels

Attention:
After the adjustment of the mechanical stops, the system parameter for the upper stop must be checked on the reciprocator control unit! The value must not be larger than the maximum stroke possible between the stops!

Maintenance

General information

Attention:
Before doing maintenance works to the reciprocator, always be sure that nobody can switch on the reciprocator!
The reciprocator has to be free of load and disconnected from mains!

The ZA06 Reciprocator was designed to operate with a minimum of maintenance. The gear box of the three-phase AC motor is self-lubricating and maintenance-free.

Regular maintenance and inspection of the reciprocator increases the working reliability and avoids damages, repair downtimes etc.!

Blow off the outside of the reciprocator with compressed air or clean it with a soft cloth from top to bottom at least once a week. If necessary, blow off the slots.

Drive unit

Attention:
Before doing maintenance works to the drive unit, always be sure that the reciprocator has to be free of load and disconnected from mains!

The gearbox of the three-phase AC motor is self-lubricating and maintenance-free!

Observe the contamination of the enclosure - strong contamination on the outside can increase the operating temperature of the drive unit!

Therefore, clean the drive unit from time to time (with a vacuum cleaner etc.). Check the drive unit gearbox monthly for oil loss. If the drive unit gearbox has to be changed for any reason, the complete unit has to be replaced!

Attention:
For safety reasons, two people should always carry out the following maintenance work!

Replacing the drive unit

If it is necessary to replace a drive unit gearbox, the complete motor unit must be dismantled from the reciprocator base. Therefore, the reciprocator has to be free of load and disconnected from mains.

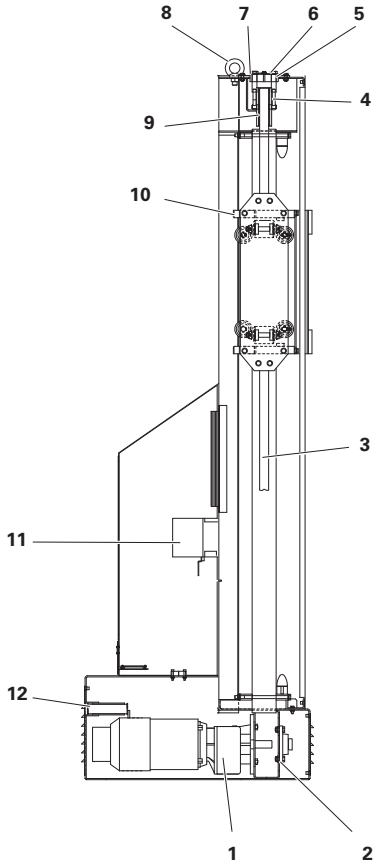
Procedure:

1. Release the motor brake (**12**) manually, let the Z carriage (**10**) move down onto the lower stop
2. Remove all cover plates from the reciprocator
3. Remove the locking plates (**7**) and loosen the tensioning screws, so that the toothed belt (**3**) is slack
4. Loosen the lower clamp plate with the toothed belt on the Z carriage (**10**) and set it down. Note the position of the clamp plate on the toothed belt holder, because it must be fitted in approximately the same position on assembly
5. Loosen the grub screw on the clamp ring in front of the flange bearing (**2**)
6. Use an appropriate iron rod (from the side, in the hole of the clamp ring) and release the clamp ring from the motor spindle (counter-clockwise)with a hammer
7. Remove the clamp ring, but do not remove the flange bearing (**2**)!

ZA06 Reciprocator - flange bearing

8. If the grub screw or the hole is not accessible, release the brake manually and turn the drive wheel by hand on an appropriate position
9. Open the clip and pull out the plug
10. Disconnect the incremental pulse generator cable from connection X8 (see electrical diagram) and pull the plug through the cable lead-through into the motor compartment
11. Support the back of the motor in such a way it remains balanced and does not tilt backwards, when the motor flange screws are loosen
12. Remove the screws and carefully remove the motor from the rear of the reciprocator base

The installation takes place exactly in the reverse order!



ZA06 Reciprocator

Toothed belt

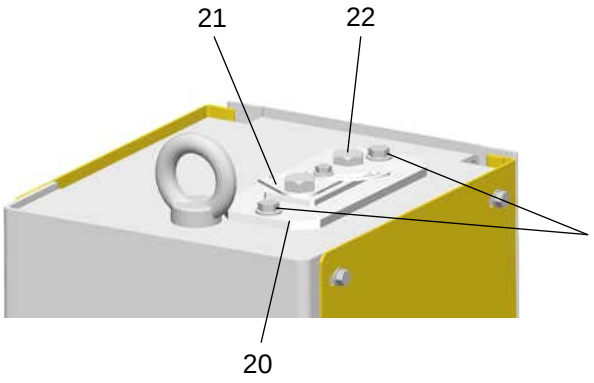
The toothed belt (**3**) should be checked regularly because it is exposed to large loads when in operation:

- The toothed belt (**3**) should be checked weekly for contamination Powder deposits should be removed with a vacuum cleaner, because this can influence the quiet running and shorten the service life of the toothed belt
- Check the toothed wheels (**9**) weekly for contamination and wear, and remove powder deposits with a vacuum cleaner
- Switch on the reciprocator and check the Z carriage (**10**) for quiet running. Check the toothed belt (**3**) for elongation or wear (noisy running, strong vibration of the belt when reversing the direction of travel)

Attention:
For safety reasons, two people should always carry out the following maintenance work!

Tensioning the toothed belt

- Remove the locking plates (**21**)
- Tighten the toothed belt evenly with the tensioning screws (**22**)
- The guide plate (**20**) must not be unscrewed for any reason - **factory setting**!



ZA06 Reciprocator - top view

Replace the toothed belt

Procedure:

1. Release the motor brake (**12**) manually, let the Z carriage (**10**) move down onto the lower stop
2. Switch off the electric power
3. Remove the boarding (side panels)
4. Remove the locking plates (**21**) and loosen the tensioning screws, so that the toothed belt (**3**) is slack
5. Loosen the lower clamp plate with the toothed belt on the Z carriage (**10**) and set it down. Note the position of the clamp plate on the toothed belt holder, because it must be fitted in approximately the same position on assembly
6. Remove the damaged toothed belt from the reciprocator column
7. Loosen the screws on the upper clamp plate and remove the toothed belt when it is completely outside of the reciprocator
8. Screw on the new toothed belt at the upper clamp plate
9. Pass the loose end of the toothed belt over the upper toothed wheel from inside the reciprocator column
10. Screw on the toothed belt at the lower clamp plate
11. Tension the toothed belt, but do not overstretch (see chapter "Tensioning the toothed belt")

Toothed wheel

Replacing the upper toothed wheel

Attention:
The following workings should only be carried out by trained personnel!

Procedure:

1. Release the motor brake (**12**) manually, let the Z carriage (**10**) move down onto the lower stop
2. Switch off the electric power
3. Remove the boarding (side panels)
4. Remove the locking plates (**21**) and loosen the tensioning screws, so that the toothed belt (**3**) is slack
5. Completely remove the front tensioning screw

Attention, danger of accident!
The Z carriage must definitely rest on the rubber buffer, before this tensioning screw is removed!

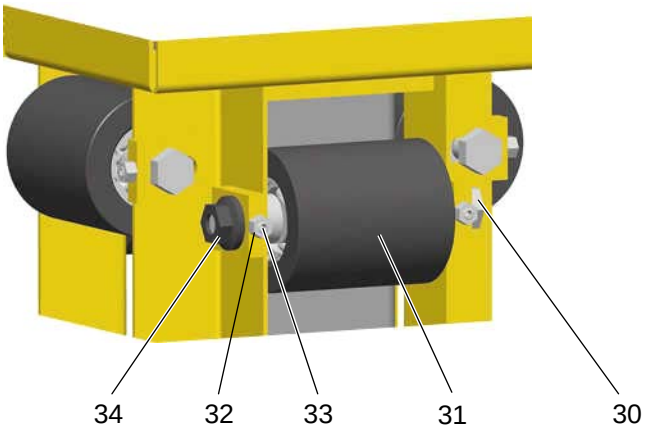
6. Hold the toothed wheel (**9**) tight in one hand whilst the eye bolt is being removed from the spindle
7. Remove the toothed (**3**) belt from the toothed wheel
8. Remove the toothed wheel (**9**) and replace it

The installation takes place exactly in the reverse order!

- If necessary, remove the service cover on the base (**1**), to check if the toothed belt (**3**) is sitting correctly on the toothed drive wheel
- Let the Z carriage slowly run up and down the column a few times, to see if the toothed belt must be tensioned more

Z carriage - rollers

If the Z carriage (**10**) starts to vibrate excessively during operation, especially at the reversing points, in most cases the cause lies in too much play in the carriage rollers, or even loose rollers!



Z carriage - rollers

In this case, proceed as follows:

1. Release the motor brake (**12**) manually, let the Z carriage (**10**) move down onto the lower stop
2. Switch off the electric power
3. Remove the boarding (front and side panels)
4. Loosen the lock nut (**32**) on the grub screw (**33**)
5. Loosen the nut (**34**) on the roller axle bolt (**30**)

Attention:
Never loosen more than one roller at the same time! Adjust only one roller after another!

6. Adjust the roller pressure with the grub screw, in such a way that the roller (**31**) can just be turned by hand
7. Tighten the roller axle bolt (**30**) and the nut (**34**)
8. Tighten the grub screw (**33**) and secure it
9. Fit the panels again and fasten them firmly

The Z carriage should run evenly and quietly again!

Decommissioning, storage

Introduction

Safety rules

Before lifting a reciprocator off of its horizontal axes, it must be secured from falling over with a lifting device such as a crane, fork lift, etc. The point of attachment is the eye bolt (**A**) at the top of the reciprocator.

ZA06 Reciprocator - top view

Requirements on personnel carrying out the work

All work should be carried out only by authorized technical personnel.

Storage conditions

Type of storage

For safety reasons, reciprocators should only be stored in a horizontal position.

Storage duration

If the physical conditions are maintained, the unit can be stored indefinitely.

Space requirements

The space requirements correspond to the sizes of the axes of motion.

The load-bearing capacity of the floor should be at least 200 kg/m².

There are no special requirements concerning distance to neighboring equipment.

Physical requirements

Storage must be inside a dry building at a temperature between +5 – 50 °C.

Hazard notes

There is no danger to personnel or the environment if the unit is stored properly.

Shut-down

Decommissioning

Before starting any kind of work, the axes of motion must be disconnected from the power supply:

- Unplug the power cable
- Unplug the ground cable

Cleaning

The running surfaces of reciprocators must be thoroughly cleaned.

Preservation

The cleaned running surfaces of the column on reciprocators must be preserved with a suitable corrosion inhibitor (oiled).

Maintenance during storage

Maintenance schedule

No maintenance schedule is necessary.

Maintenance works

During long-term storage, periodically perform a visual check for corrosion.

Packing, transport

Introduction

This chapter describes special precautions that must be taken during internal transport of the product if:

- the customer himself must pack, transport and ship the product, such as to have renovations or service work carried out by the manufacturer

or

- the product must be shipped for disposal (recycling).

Requirements on personnel carrying out the work

All work must be carried out by personnel trained in packing machines.

Packing material

Selection of packing material

Suitably stable wood packing material must be used.

Procedure when packing

Transport the unit only in a horizontal position.

Reciprocators with a stroke length of more than 1800 mm must be supported in the center of the column.

Transport

Data concerning goods to be transported

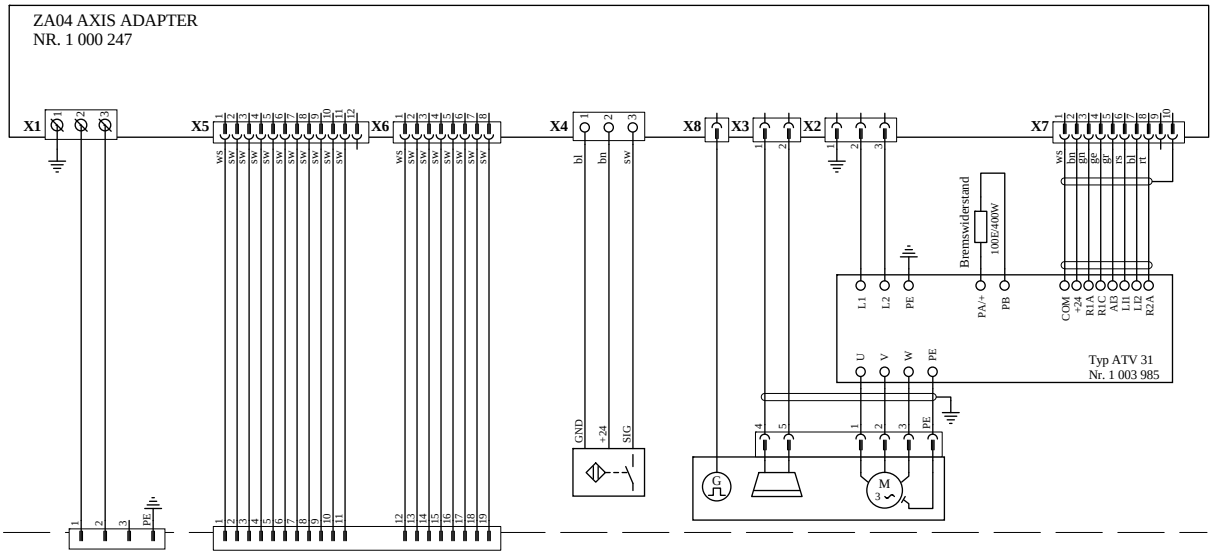
The space requirements correspond to the size of the axes of motion plus the packaging.

Loading, transferring the load, unloading

At least one fork lift must be available.

Schematic diagrams

ZA06 Reciprocator - wiring diagram



ZA06 Reciprocator - wiring diagram

X1	Power supply	X5	Drive I/O connection
X2	FU***** power supply	X6	Drive I/O connection
X3	Motor brake connection	X7	FU***** signal connection
X4	Proximity switch connection	X8	Incremental pulse generator connection

***** FU = Frequency converter

Frequency converter

Overview

Frequency converter

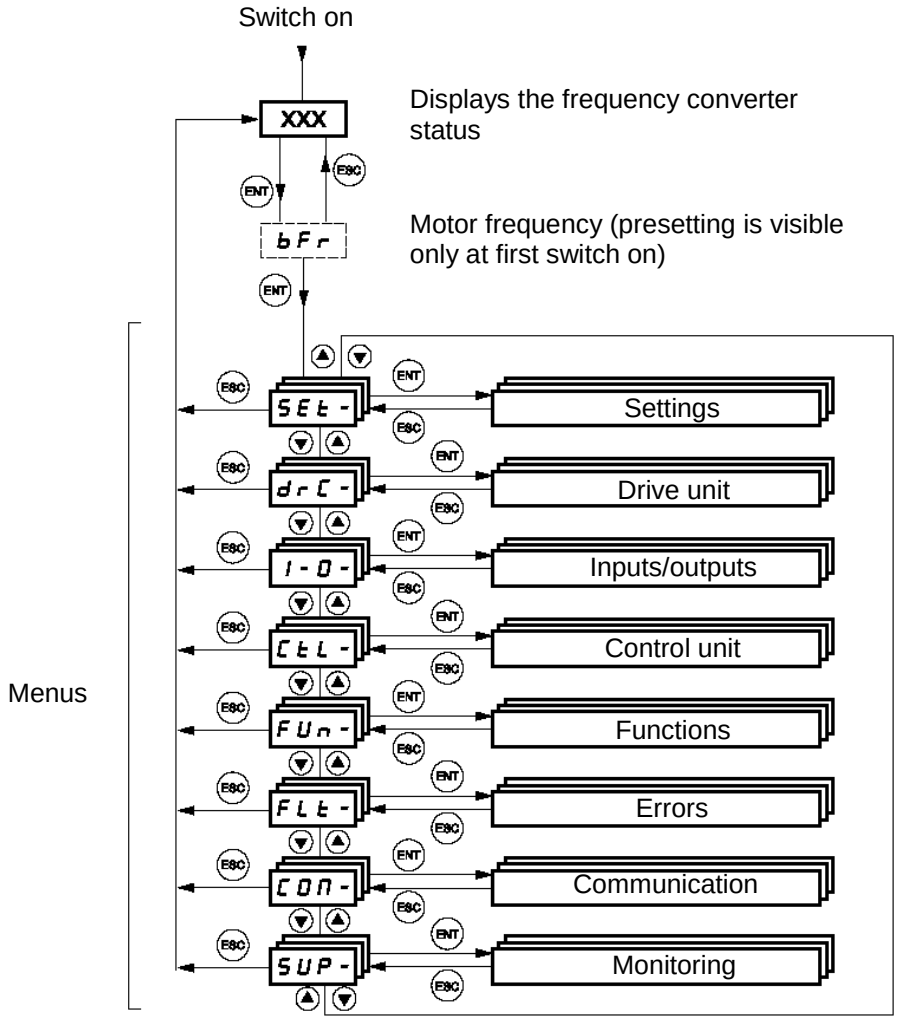
General information

The frequency converter in the ZA06 Reciprocator is installed for power regulation. The parameters of this device are already adjusted to the Gema specific values and therefore may not be changed no more!

All adjustments of stroke, speed of etc. can be made at the OptiMove control (for details, see the corresponding reciprocator control unit manual).

Function/operation

Access to menus



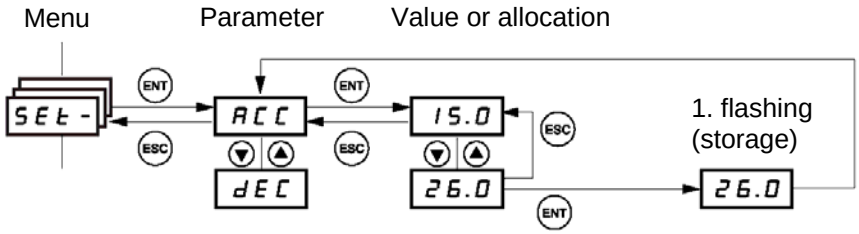
Frequency converter - access to menus

Access to menu parameters

The storage/recording of the indicated selection takes place with ENT

The display flashes during storage.

Example:



Frequency converter - access to menus/storage

Adjusted parameters

Menu "SET - "	Code	Value
	ACC	0.1 sec.
	DEC	0.1 sec.
	HSP	110 Hz
	ITH	3.7 A
	TDC1	1.0 sec.
	SDC1	3.7 A
	CL2	3.0 A
	SFR	16 kHz

Menu "DRC - "	Code	Value
	UNS	210 V
	FRS	87 Hz
	NCR	3.3 A
	NSP	2540 rpm
	COS	0.8
	RSC	active
	TUN	Pon
	NRD	no
	SFR	16 kHz
	TFR	110 Hz
	SRF	yes

Menu "I-O - "	Code	Value
	CRL3	4.7 mA

Menu "CTL - "	Code	Value
	LAC	L2
	FR1	AI3

Menu "FUN - "	Code	Value
	RPC BRA	no
	LC2 LC2	LI6
	CL2 CL2	3.0 A

Note:
The resetting of the frequency converter to the Gema factory setting takes place by the FSC parameter in the "DRC" menu!

Maintenance

The frequency converter (FU) does not require a preventive maintenance. However, it is recommended to carry out the following inspections by the user in regular intervals:

- Check condition and tightness of the cable connections
- Check the efficacy of the ventilation (average life span of the fan approx. 3-5 years)
- Remove the dust from frequency converter (FU)

Replace the frequency converter

If a frequency converter exchange has taken place, it is to be noted, that all shielded cables are properly attached again on the EMV plate!

Attention:
The cover plate of the frequency converter is to be kept always closed!
Before interventions take place in the device, the power supply must be switched off! After switching off the power supply, wait at least 10 min. before working on the equipment, because the internal condensers need this time for discharging!

Spare parts list

Ordering spare parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

- Type and serial number of your powder coating equipment
- Order number, quantity and description of each spare part

Example:

- **Type** ZA06 Reciprocator
  Serial number 1234 5678
- **Order no.** 203 386, 1 piece, Clamp - Ø 18/15 mm

When ordering cable or hose material, the required length must also be given. The spare part numbers of this yard/meter ware is always marked with an *****.

The wear parts are always marked with a #.

All dimensions of plastic hoses are specified with the external and internal diameter:

Example:

Ø 8/6 mm, 8 mm outside diameter (o/d) / 6 mm inside diameter (i/d)

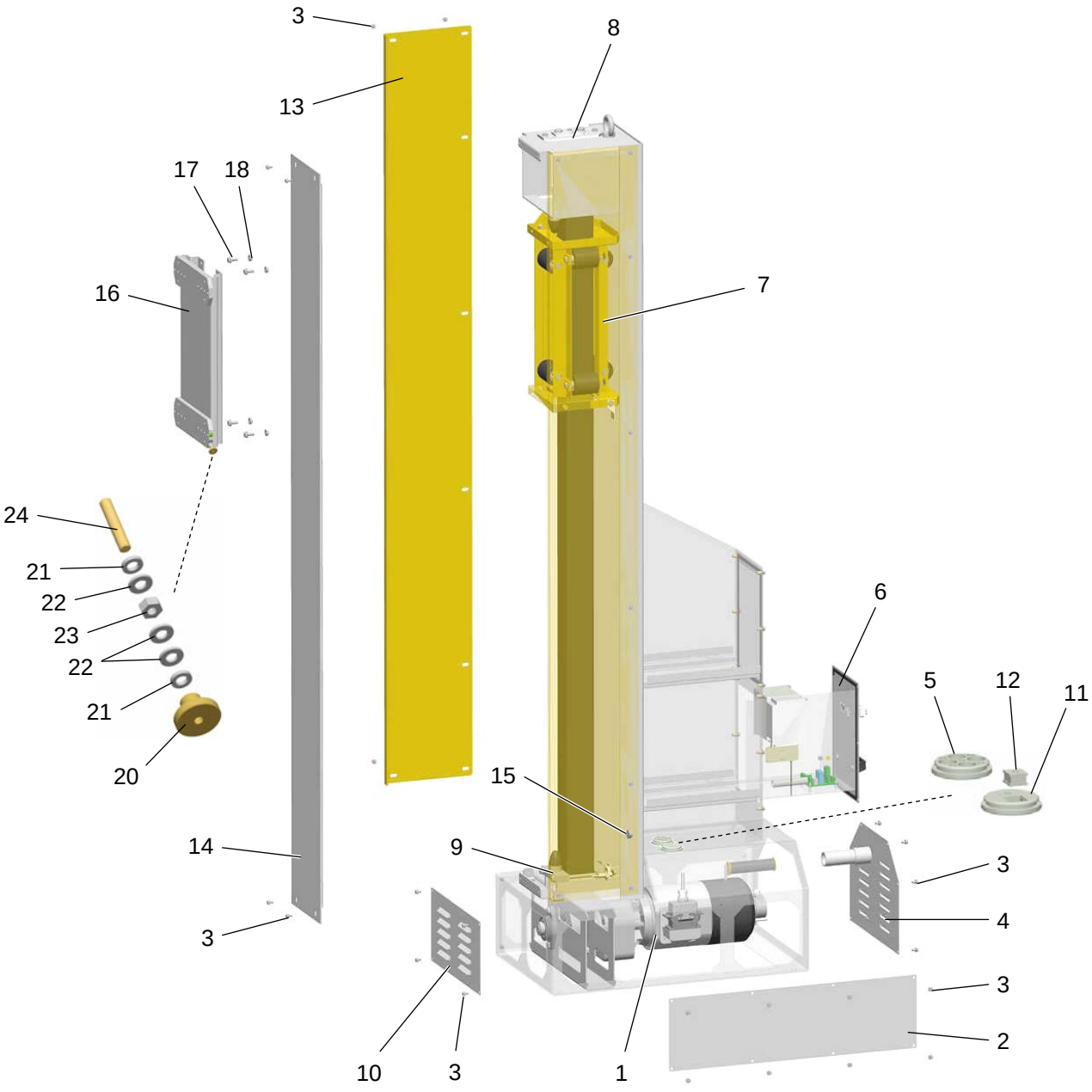
WARNING!
Only original Gema spare parts should be used, because the hazardous location approval will be preserved that way! The use of spare parts from other manufacturers will invalidate the Gema guarantee conditions!

ZA06 Reciprocator - spare parts list

1	Drive unit - complete, see "ZA06 Reciprocator - drive unit (complete)"	
2	Service cover MA	1004 016
3	Hexagon screw - M6x10 mm	1001 081
4	Service cover MS	1004 015
5	Cable lead-through - Ø 50 mm, 5+4	1004 006
6	Electrical module, see "ZA06 Reciprocator - electrical module"	
7	Z carriage - complete, see "ZA06 Reciprocator - Z carriage (complete)"	
8	Toothed wheel, see "ZA06 Reciprocator - toothed wheel"	
9	Proximity switch, see "ZA06 Reciprocator - proximity switch"	
10	Service cover SS	1004 017
11	Cable lead-through - Ø 50 mm, double	1004 007
12	Cable grommet QT6	1004 531
13	Panel - lateral	
	ZA06-13	386 502
	ZA06-18	386 510
	ZA06-23	386 529
	ZA06-28	386 537
	ZA06-33/38	1004 454*****
14	Panel - front	
	ZA06-13	1004 011
	ZA06-18	1004 012
	ZA06-23	1004 013
	ZA06-28	1004 014
	ZA06-33/38	1004 455*****
15	Membrane grommet	1003 578
16	Gun holder plate - complete	386 693
	Gun holder plate - special (not shown)	1004 453
	Spacer (not shown)	1004 456
17	Hexagon shakeproof screw - M8x20 mm	244 422
18	Hexagon shakeproof nut - M8	244 449
20	Milled nut - M6, brass	200 433
21	Shake proof washer - A-type, M6	200 450
22	Washer - Ø 6.4/12.5x1.6 mm, brass	200 476
23	Hexagon nut - M6, brass	200 417
24	Hexagon screw - M6x35 mm	389 838

***** Please indicate length

ZA06 Reciprocator - spare parts



ZA06 Reciprocator - spare parts

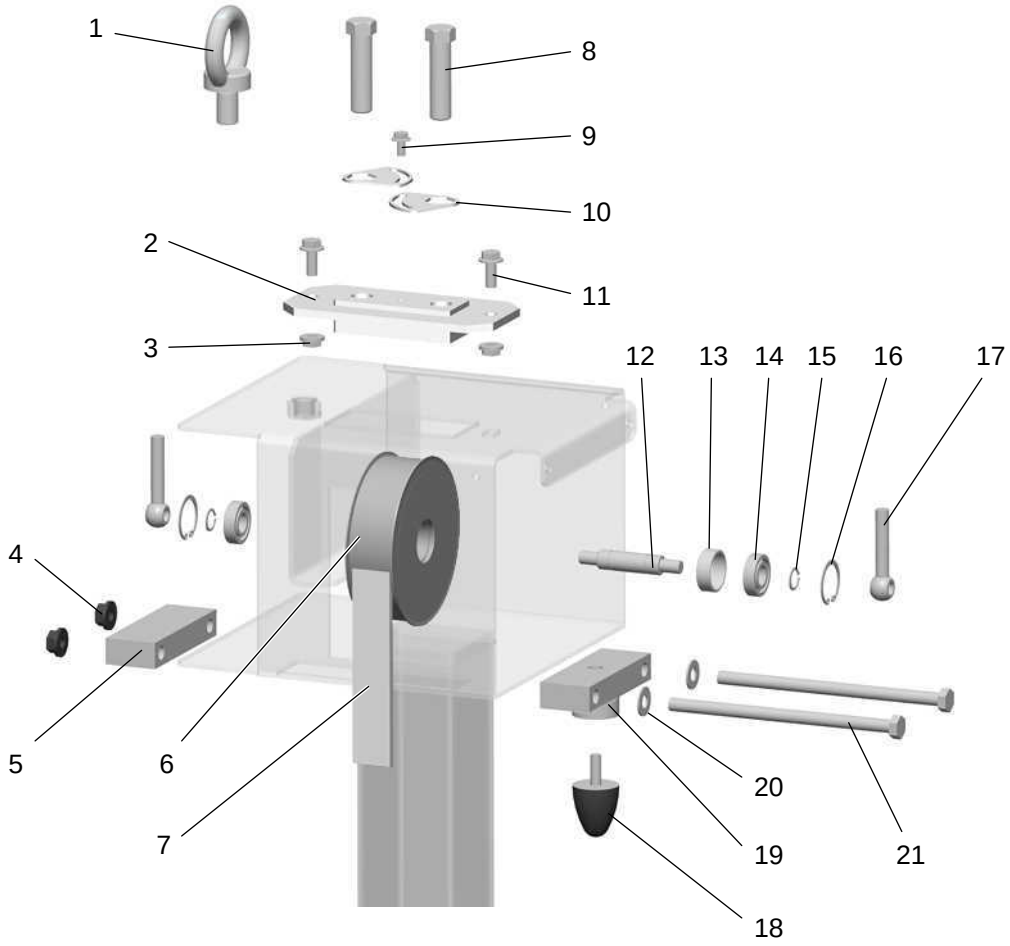
ZA06 Reciprocator - toothed wheel

1	Eye bolt - M16	264 415
2	Guide plate	386 588
3	Hexagon shakeproof nut - M8	244 449
4	Hexagon ribbed nut - M10	234 656
5	Counter profile - 40/20x115 mm	386 774
6	Toothed wheel	386 600
7	Toothed belt	103 730#*
	ZA06-13 - L=4215 mm	
	ZA06-18 - L=5215 mm	
	ZA06-23 - L=6215 mm	
	ZA06-28 - L=7215 mm	
8	Tensioning screw	386 596
9	Hexagon shakeproof screw - M6x12 mm	244 406
10	Locking plate	386 634
11	Hexagon shakeproof screw - M8x20 mm	244 422
12	Toothed wheel spindle	386 766
13	Spacer ring - Ø 31.9/28x11 mm	386 618
14	Bearing - Ø 15/32x9 mm	241 709
15	Snap ring - A-15	233 617
16	Snap ring - I-32	245 780
17	Eyebolt - M10x60 mm	264 202
18	Rubber buffer - Ø 35x40 mm, M8/A	211 664
19	Stop plate	386 782
20	Ribbed washer - M10	237 981
21	Hexagon screw - M10x180 mm	201 855

***** Please indicate length

Wearing part

ZA06 Reciprocator - toothed wheel

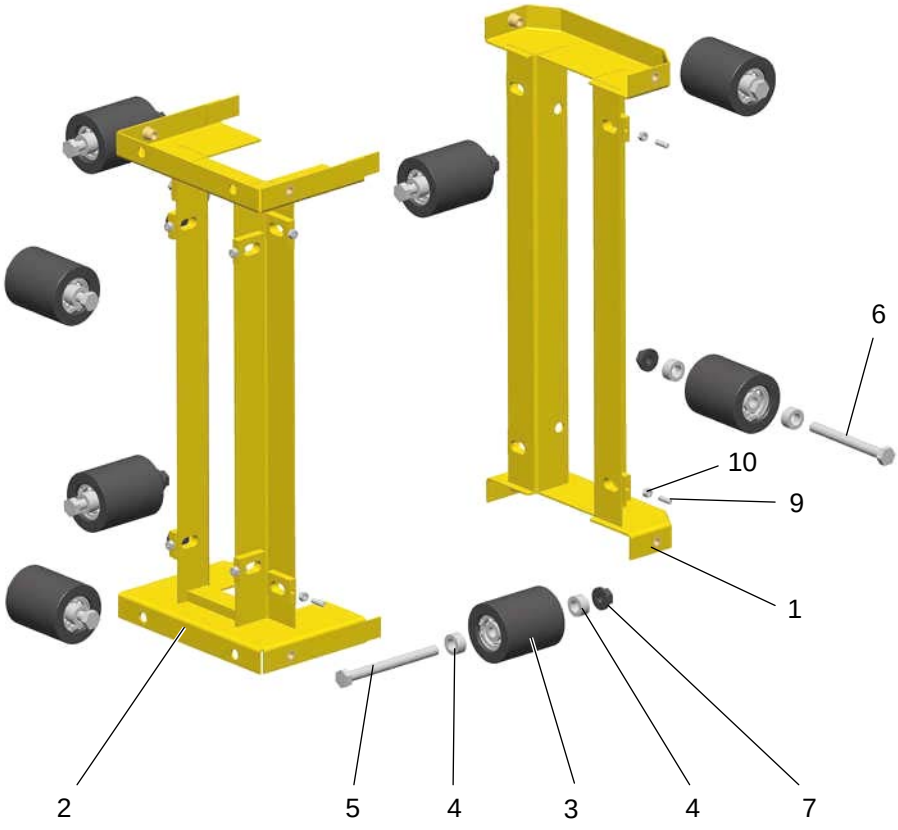


ZA06 Reciprocator - toothed wheel

ZA06 Reciprocator - Z carriage (complete)

1	Carriage - fixed side (without pos. 9, 10)	386 677
2	Carriage - adjustable side (without pos. 9, 10)	386 685
3	Roller - complete	307 165#
4	Spacer sleeve	308 013
5	Hexagon screw - M10x110 mm	214 221
6	Hexagon screw - M10x100 mm	214 213
7	Hexagon ribbed nut - M10, black	234 656
9	Hexagon grub screw - M5x16 mm	237 744
10	Hexagon nut - M5	205 150

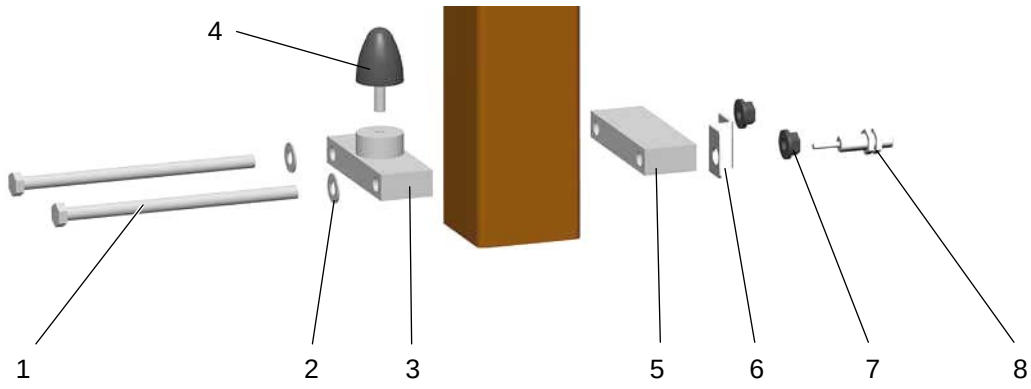
Wearing part



ZA06 Reciprocator - Z carriage (complete)

ZA06 Reciprocator - proximity switch

1	Hexagon screw - M10x180 mm	201 855
2	Ribbed washer - M10	237 981
3	Stop plate	386 782
4	Rubber buffer - Ø 35x40 mm, M8/A	211 664
5	Counter profile - 40/20x115 mm	386 774
6	Limit switch holder	1003 980
7	Hexagon ribbed nut - M10	234 656
8	Proximity switch	229 180

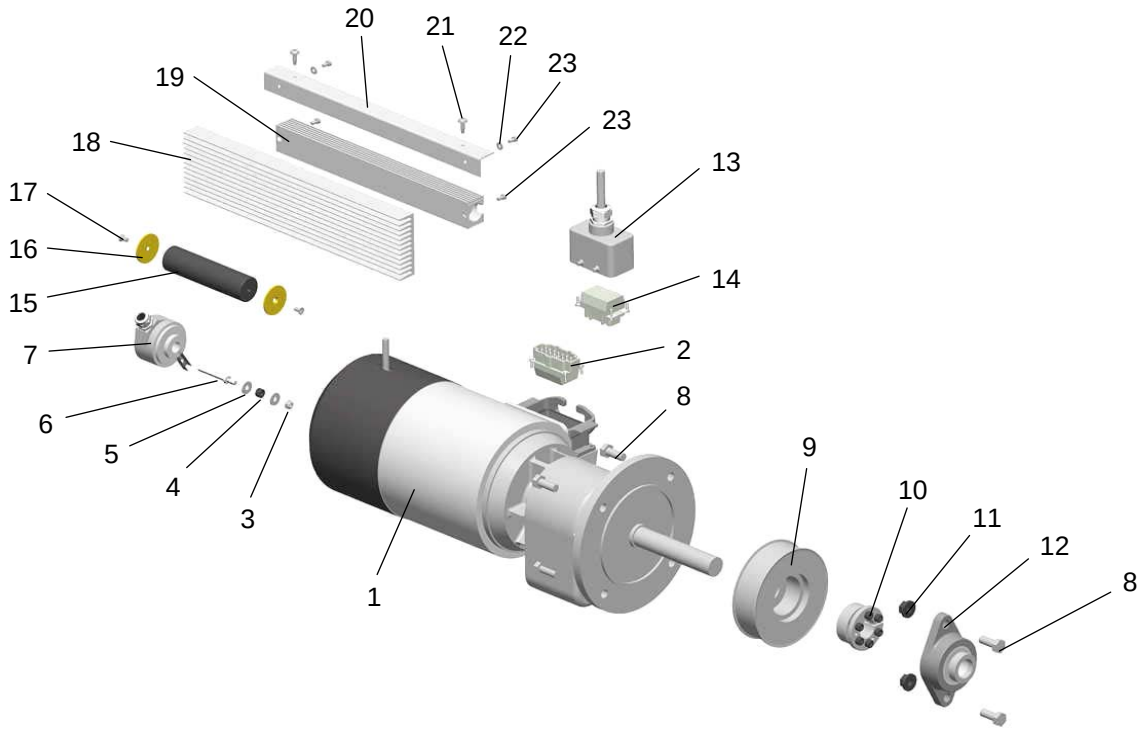


ZA06 Reciprocator - proximity switch

ZA06 Reciprocator - drive unit (complete)

	Motor-gearbox unit (without pulse generator) - complete (incl. pos. 1-6)	1004 019
1	Motor/gearbox - 0.75 kW (incl. pos. 2)	1004 020
2	Plug insert - 10-P	211 540
3	Locknut - M6	1003 822
4	Cable bush - ID5 mm	1003 821
5	Washer - Ø 6.4/16x1.6 mm	215 805
6	Torque support - Ø 6/M6	1003 819
7	Pulse generator	268 925
8	Hexagon screw - M10x25 mm	214 116
9	Toothed belt wheel	368 610
10	Tensioning set - Ø 25/50x22 mm	264 199
11	Hexagon ribbed nut - M10	234 656
12	Flange bearing - Ø 25 mm	264 210
13	Motor-/brake cable ZA	1004 018
14	Socket insert - 10-P	211 532
15	Switch lever	386 456
16	Switch plate	386 464
17	Countersunk-head screw - M5x10 mm	214 671
18	Heat sink	386 740
19	Brake resistor - 100 Ohm/400 W	264 172
20	Heat sink holder	1003 978
21	Cap screw - 50x16 mm	1002 965
22	Ribbed washer - M4	264 822
23	Countersunk cylinder screw - M4x8 mm	216 259

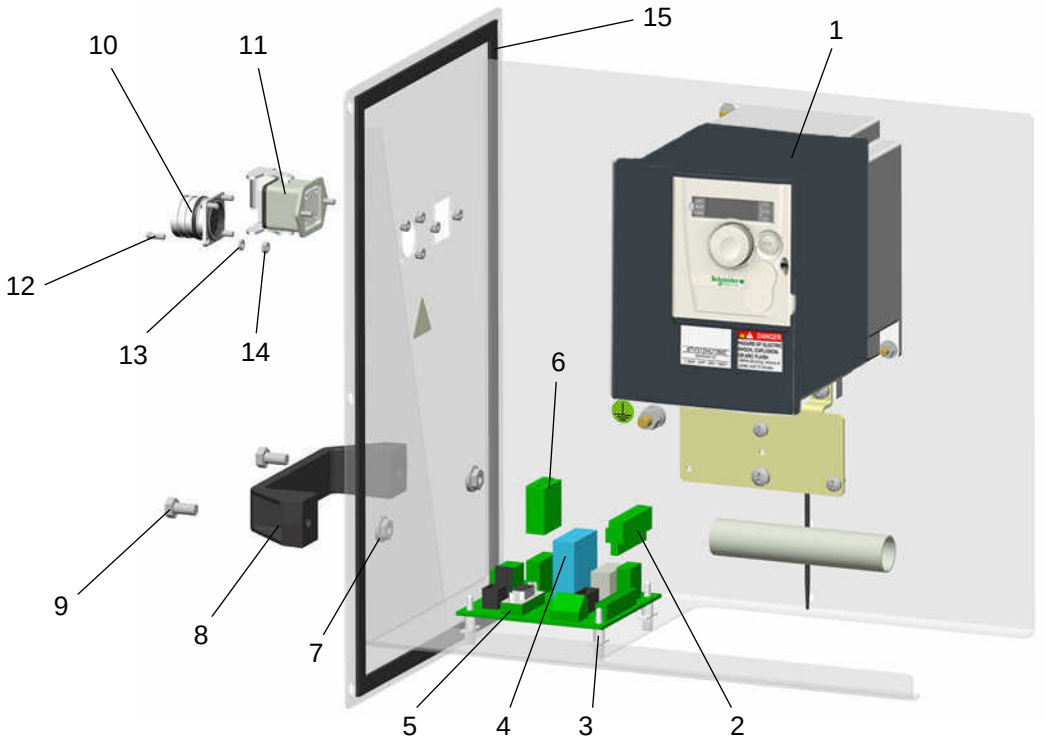
ZA06 Reciprocator - drive unit



ZA06 Reciprocator - drive unit (complete)

ZA06 Reciprocator - electrical module

1	Frequency converter - 1.1 kW, for ZA06	1003 985
2	Signals-frequency converter connection	1000 314
3	Spacer - Ø 4 / Ø 4.8/9.4 mm	266 833
4	Relay - 24 VDC, for motor brake	250 961
5	Axis adaptor - complete	1000 247
6	Frequency converter mains connection	1000 312
7	Hexagon shakeproof nut - M6	244 430
8	Handhold	244 864
9	Hexagon screw - M6x12 mm	213 810
10	Drive I/O connection - complete	1004 105
11	Power supply	1003 990
12	Cylinder screw - M3x8 mm	268 801
13	Shake proof washer - A-type, M3	205 885
14	Hexagon nut - M3	202 142
15	Adhesive seal strip - 9x2 mm	100 250
	ZA06 power supply cable-OptiMove - L=20 m (not shown)	1000 280
	ZA06 signal cable-OptiMove - L=20 m (not shown)	1000 281



ZA06 Reciprocator - electrical module

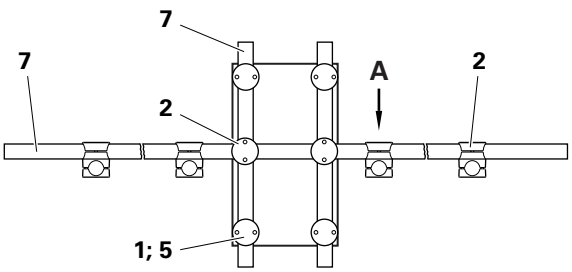
ZA06 Reciprocator - gun holders

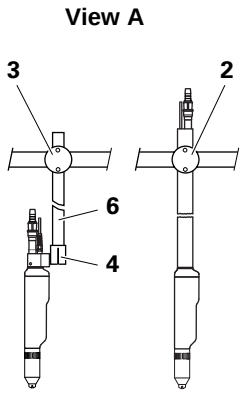
Note:
The following examples show a possible configuration of gun holders. Please contact the Gema Service department in the case of special configurations!

Gun holder for 1-4 guns

1	Clamp element-half (order in pairs)	363 987
2	Cross clamping element - Ø 40/40 mm	363 910
3	Cross clamping element - Ø 40/30 mm	363 936
	Cross clamping element - Ø 30/30 mm	363 952
4	see gun attachment etc.	
5	Allen cylinder screw - M8x50 mm	235 113
6	Tube - Ø 30x600 mm	337 528
	Tube - Ø 30x800 mm	337 536
	Tube - Ø 30x800 mm	337 544
	Tube - Ø 30 mm	103 306*****
6.1	Tube plug - Ø 30 mm, for pos. 6	236 373
7	Tube - Ø 40x600 mm	337 552
	Tube - Ø 40x1000 mm	337 560
	Tube - Ø 40x1500 mm	337 579
	Tube - Ø 40x2000 mm	337 587
	Tube - Ø 40 mm	103 314*****
7.1	Tube plug - Ø 40 mm, for pos. 7	236 381

***** Please indicate length



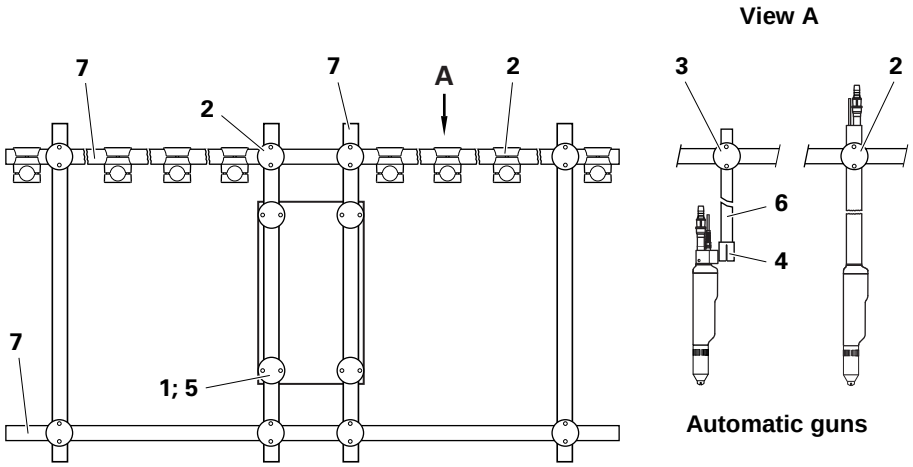


Automatic guns

Gun holder for 5-8 guns

1	Clamp element-half (order in pairs)	363 987
2	Cross clamping element - Ø 40/40 mm	363 910
3	Cross clamping element - Ø 40/30 mm	363 936
	Cross clamping element - Ø 30/30 mm	363 952
4	see gun attachment etc.	
5	Allen cylinder screw - M8x50 mm	235 113
6	Tube - Ø 30x600 mm	337 528
	Tube - Ø 30x800 mm	337 536
	Tube - Ø 30x1000 mm	337 544
	Tube - Ø 30 mm	103 306*****
6.1	Tube plug - Ø 30 mm, for pos. 6	236 373
7	Tube - Ø 40x600 mm	337 552
	Tube - Ø 40x1000 mm	337 560
	Tube - Ø 40x1500 mm	337 579
	Tube - Ø 40x2000 mm	337 587
	Tube - Ø 40 mm	103 314*****
7.1	Tube plug - Ø 40 mm, for pos. 7	236 381

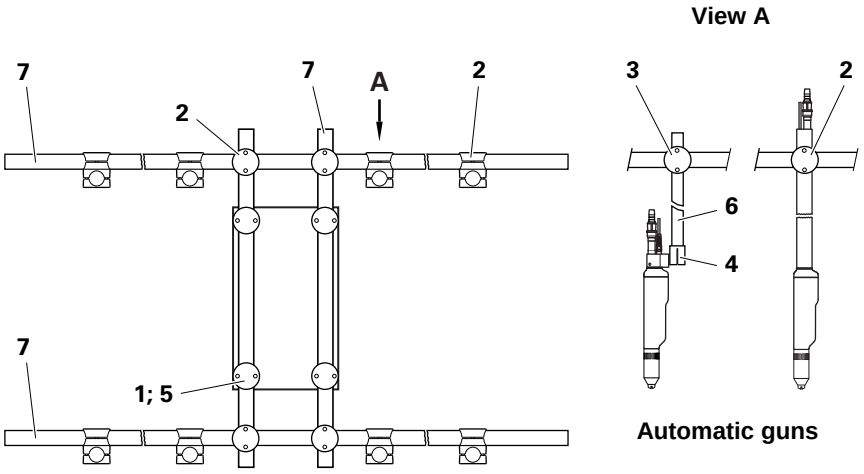
***** Please indicate length



Gun holder for 2x1-4 guns

1	Clamp element-half (order in pairs)	363 987
2	Cross clamping element - Ø 40/40 mm	363 910
3	Cross clamping element - Ø 40/30 mm	363 936
	Cross clamping element - Ø 30/30 mm	363 952
4	see gun attachment etc.	
5	Allen cylinder screw - M8x50 mm	235 113
6	Tube - Ø 30x600 mm	337 528
	Tube - Ø 30x800 mm	337 536
	Tube - Ø 30x1000 mm	337 544
	Tube - Ø 30 mm	103 306*****
6.1	Tube plug - Ø 30 mm, for pos. 6	236 373
7	Tube - Ø 40x600 mm	337 552
	Tube - Ø 40x1000 mm	337 560
	Tube - Ø 40x1500 mm	337 579
	Tube - Ø 40x2000 mm	337 587
	Tube - Ø 40 mm	103 314*****
7.1	Tube plug - Ø 40 mm, for pos. 7	236 381

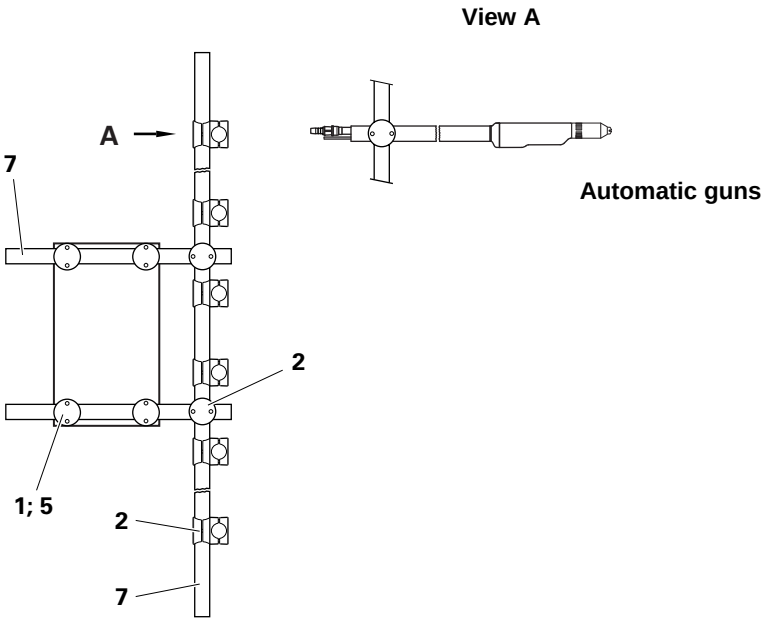
***** Please indicate length



Vertical gun holder

1	Clamp element-half (order in pairs)	363 987
2	Cross clamping element - Ø 40/40 mm	363 910
3	Cross clamping element - Ø 40/30 mm	363 936
	Cross clamping element - Ø 30/30 mm	363 952
4	see gun attachment etc.	
5	Allen cylinder screw - M8x50 mm	235 113
6	Tube - Ø 30x600 mm	337 528
	Tube - Ø 30x800 mm	337 536
	Tube - Ø 30x1000 mm	337 544
	Tube - Ø 30 mm	103 306*****
6.1	Tube plug - Ø 30 mm, for pos. 6	236 373
7	Tube - Ø 40x600 mm	337 552
	Tube - Ø 40x1000 mm	337 560
	Tube - Ø 40x1500 mm	337 579
	Tube - Ø 40x2000 mm	337 587
	Tube - Ø 40 mm	103 314*****
7.1	Tube plug - Ø 40 mm, for pos. 7	236 381

***** Please indicate length

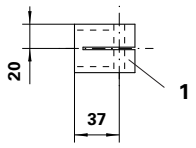


Gun fixtures and collision protection

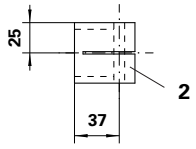
1	Gun fixture - Ø 30 mm	350 150
2	Gun fixture - Ø 39 mm (for plastic tube only)	354 317
2	Gun fixture - Ø 40 mm	1000 507
3	Gun fixture - Ø 40 mm (transverse)	356 670
4	Collision protection - Ø 30 mm (for ZA axis)	364 215
5	Dummy piece - complete, Ø 30 mm (for ZA axis)	364 231
6	Collision protection - Ø 30 mm (for YT axis)	364 223
7	Dummy piece - complete, Ø 30 mm (for YT axis)	364 240

Gun fixtures

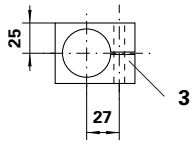
Ø 30



Ø 39/Ø 40

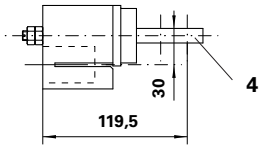


Ø 40

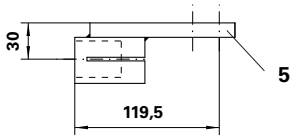


Collision protection

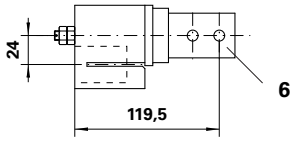
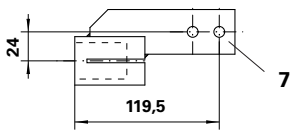
Ø 30



Ø 30



Ø 30



Ø 30